



Montana Department of
ENVIRONMENTAL QUALITY

Brian Schweitzer, Governor

P.O. Box 200901 • Helena, MT 59620-0901 • (406) 444-2544 • www.deq.mt.gov

May 8, 2012

Roger Hoogerheide
Support Agency Coordinator
U.S. Environmental Protection Agency
10 W. 15th Street, Suite 3200
Helena, MT 59626

Re: State Responses to EPA Comments on the draft Preliminary Design Plan
Reach A, Phase 1, Clark Fork Site

Dear Roger,

This letter follows conversations we have had on various levels between DEQ, NRD and EPA, together with our staff/management/legal meeting on May 1, 2012. Pursuant to EPA's request, we have converted our speaking notes from the May 1st meeting into a written response to EPA's letter of March 13, 2012 from Julie DalSoglio to Richard Oppen. The text of EPA's March 13, 2012 letter was broken into one or more, numbered, italicized paragraphs. The text of EPA's comments is in italics. DEQ's responses are in regular text and will follow the heading **DEQ Response:**

Page 1, ¶ 1 *This letter addresses comments on the draft Preliminary Design Plan (PDP) for Reach A, Phase 1 of the Clark Fork Site, prepared by the State Department of Environmental Quality (DEQ). The draft PDP outlines an ambitious and environmentally significant cleanup plan for the Reach A, Phase 1 area. The EPA appreciates the amount of work and effort that has gone into the development of this draft PDP. The EPA looks forward to cooperatively completing cleanup design plans for this site in a timely manner, so that this project can be implemented successfully by the State of Montana.*

Page 1, ¶ 2 *The EPA received the draft PDP on December 16, 2011. We then received technical memoranda, attachments, and review memoranda by State contractors in late December and early January 2012. The EPA was given a briefing by the State technical and legal team on the draft PDP on January 31, 2012. We have been working diligently on our comments throughout this time frame, and very much want to cooperate with DEQ's desire to begin preliminary work on this project in 2012. In general, EPA is supportive of the design approach.*

Page 1, ¶ 3 *The EPA's comments on the draft PDP are submitted pursuant to the Clark Fork Site and Remaining State of Montana Clark Fork Basin Natural Resource Damage Claims Consent Decree (Clark Fork Site CD), paragraphs 38 and 44.*

DEQ Response:

Thank you for your comments on the draft Preliminary Design Plan for Reach A, Phase 1 of the Clark Fork Site. We appreciate EPA's support for this design approach and its agreement to work cooperatively with DEQ and other stakeholders to reach our common goal of commencing remedial construction on Phase 1 in the fall of 2012. To reach our goal, we must move forward very, very quickly. Our intention is to share the draft construction bid package for the project with you by the first week in June. We would ask that EPA's review time be no longer than fifteen (15) working days. We will then revise the draft into a final construction bid package as soon as is practicable.

Page 1, ¶ 4 *The Clark Fork Site CD, in Paragraph 44, describes five categories of comments on documents the EPA may comment upon: technical adequacy, consistency with CERCLA, consistency with the National Contingency Plan (NCP), consistency with the Record of Decision, consistency with the Superfund Memorandum of Agreement for the Clark Fork Site, or consistency with the Clark Fork Site CD. The substantive comments below focus on technical adequacy and issues regarding applicable or relevant and appropriate requirements (ARARs) — the Clark Fork Site CD requires work to be in compliance with ARARs as does CERCLA and the NCP. We believe these comments can be resolved readily through continued consultation between our agencies, the US Fish and Wildlife Service, and other parties. We are committed to working through these comments at the staff and management level in a timely and cooperative manner.*

DEQ Response:

DEQ acknowledges compliance with ARARs is required. DEQ shall manage the remedial action to achieve these goals. EPA is encouraged to identify and bring to DEQ's attention any specific concerns as to a particular ARAR requirement that may not be met. There are often a number of ways to achieve compliance with ARARs. We believe that these matters can be resolved through continued consultation between agencies

Page 2, ¶ 1 *Subparagraph 44.a. of the Clark Fork Site Consent Decree states that DEQ shall incorporate or attempt to resolve all comments submitted by the EPA on any plan or report submitted to the EPA for review and comment before proceeding to the next phase of remedial design. As noted above, EPA is committed to working through all of these comments expeditiously with you, but we are concerned that recent instructions to DEQ contractors for completing the Reach A, Phase 1 design do not build in time for this step and to occur as required. We are available for discussion and resolution of these comments as soon as possible to assist DEQ in moving the project forward.*

DEQ Response:

CD requirements for EPA's review and comment are noted. The State and EPA have mutually agreed move forward the Reach A, Phase 1 design, with construction to begin this fall. To reach our goal, we must address concerns and develop a dialog between us on multiple fronts. DEQ encourages any constructive feedback that improves the design or makes it more likely to meet requirements of concern.

We directed DEQ contractors to prepare the draft Remedial Action Work Plan, in the form of a construction bid package, the next design document required by the CD. These instructions to contractors were necessary to keep the project moving forward towards construction. DEQ is responsible under the CD for procuring, directing and overseeing the project work. But, as we discussed during our May 1, 2012, meeting, this expedited schedule does not mean that DEQ is not hearing, addressing or otherwise taking into account design comments where practicable as the draft and then final design documents are prepared and shared with EPA (as well as other stakeholders). DEQ will incorporate or attempt to resolve all the comments submitted by EPA and shall notify EPA of the disposition of comments as we move forward. Understand that because we are moving forward on multiple fronts at once, some answers to your questions and comments will be provided sooner than others.

Page 2, ¶ 2 *Our understanding is that a final PDP or similar document will be produced that will incorporate or address these comments (after discussion with EPA) as well as the review comments from DEQ's consultants. It is also our understanding that the design review team, which involves members of the public and other agencies, will be given the opportunity to review and comment on the design plans as well.*

DEQ Response:

The CD does not require DEQ to prepare or submit the final Preliminary Design Plan envisioned by EPA. However, after our May 1st meeting, DEQ has a better sense of EPA concerns. Hopefully, we answered your more critical questions and directed your attention to other documents where requested information will be available (e.g., the Draft CFR Geomorphology and Vegetation Monitoring Plan, prepared by DEQ contractors and currently in internal review by DEQ). The next design document DEQ will share with EPA for review and comment will be the draft Remedial Action Work Plan that will take the form of a draft construction bid package. The construction bid package shall include all drawings pertaining to the Work to be performed, a summary of the actions necessary to implement the Work in the drawings, technical specifications, an estimated timeframe for completing the Work, and any other relevant special provisions.

Page 2, ¶ 3: *The EPA will address these comments constructively and otherwise coordinate with remedial action implementation at this site with DEQ. We have mutually agreed to have this particular design go forward in a cooperative and timely manner with a funding arrangement that is 80% remedial funding and 20% State restoration funding for implementation of the final Reach A, Phase 1 design.*

Page 2, ¶ 4: *Further development and implementation of this design, along with further discussions about the ROD, should lead to a mutually shared view of the Clark Fork Site remedy between the two agencies. This letter does not contain our detailed comments regarding consistency with the ROD, SMOA, and Consent Decree because of the understandings we have reached during separate discussions regarding these issues. We look forward to the continuing discussion with you on these topics.*

DEQ Response:

The State acknowledges the agreement between the agencies to allocate the remedy and restoration costs, a settlement to permit the Reach A, Phase 1 design to be constructed this fall. We look forward to broader and continued discussions with EPA as we develop and implement this action. These discussions should lead to a better, more mutually shared view of the remedy for the Clark Fork Site.

Page 2, ¶ 5 *Design requirements should contain a complete description of how ARARs, including pertinent citations, and a description of how these standards will be translated into engineering parameters. Key ARARs — such as stormwater control and construction Best Management Practices ARARs — should be listed and a description of how this plan complies with those ARARs should be given. One very important ARAR — the federal Endangered Species Act — needs careful consideration for this project. The Biological Opinion for the Clark Fork Site remediation lists substantive provisions that must be followed for the protection of bull trout and other threatened or endangered species, and this will require direct interaction with the US Fish and Wildlife Service (US FWS) and its counterparts within the State Fish, Wildlife and Parks Department. The EPA believes it is important for the DEQ to consider these issues carefully and describe compliance efforts in the next version of the plan. In general, we suggest that the PDP discuss this ARAR in greater detail.*

DEQ Response:

As discussed in our May 1st meeting, the draft construction bid package **will not** contain a complete description of how ARARs are translated into engineering requirements or how the action will meet key ARARs requirements. However the draft and final construction bid package receives significant DEQ legal review, including a review to ensure compliance with ARARs. We are happy to discuss with EPA how we anticipate ARARs will be met with respect to any specific requirement. For example, we will be removing a significant amount of contaminated material from streambanks and from the floodplain within Reach A, Phase 1 project area.

The USF&WS Biological Opinion for Bull Trout (BO) describes the exposed tailings, buried tailings and contaminated sediments deposited extensively throughout the Clark Fork River banks and 100-year floodplain as the over-riding factors affecting bull trout and bull trout habitat. Removal of these exposed tailings, buried tailings and other contaminated material from the floodplain should help us meet this key requirement in the ARARs.

The Biological Opinion also identifies a number of terms and conditions (construction stormwater BMPs) that will be reflected in both the special provisions and in the details of

erosion control and transportation plans, submitted to DEQ for approval as part of the construction contract process. Construction quality control is subject to DEQ oversight (by DEQ and its Engineer) during the implementation of the remedial construction contract.

Page 2, ¶ 6 *Upon implementation of this plan, the current landscape within the floodplain will be significantly modified with increased wetlands, open water, emergent wetlands, and secondary channels. Land use, typically open space and wildlife habitat, will change. The EPA has concerns with transitioning from the inset floodplain channel plan back into the existing downstream channel pattern at the Phase 1 area northern boundary because the low pH (<6.5) level contamination is not at depth in Phase 2 in the southern areas to support lowering the floodplain through remediation. Also, there is private property in the southern boundary on the east side of Phase 2 and this property owner has not been consulted about the family's intended future land use. Transitioning from the inset floodplain channel plan back into the existing downstream channel pattern was also raised as a potential geomorphic stability issue by DEQ's contractors in the draft preliminary design plan (draft PDP) and needs more attention during the remaining design process.*

DEQ Response:

The State has not determined the design for the Phase 2 floodplain so we can't address longer-term issues that may occur between Phase 1 and Phase 2, until we have a design for Phase 2. However, EPA brings up a good point that there could be issues with out of bank flow causing excessive floodplain and/or bank erosion where the flow re-enters the river near the end of Phase 1. In response the State is re-examining the transition area between Phase 1 and 2 by using floodplain hydraulics to model the effects of the return flow. As a result of this re-examination, which will be done prior to the completion of the draft design, we may upgrade bank treatments to prevent nick points, or add additional floodplain erosion features, such as brush trenches or other techniques, to address potential floodplain erosion. Any changes to the design will be included in the draft bid package for Phase 1.

Page 3, ¶ 1 *Furthermore, while the proposed bank stabilization treatments are technically sound, the use of a small number of treatments to treat an extensive project reach length with heterogeneity in local slopes, bank heights, soil types, hydric characteristics, and near bank shear stresses, as proposed in the draft PDP, should be reconsidered. This point was echoed in the review by River Design Group (RDG) which was completed for the State. Discontinuous deposits of clay as well as lenses of less resistant, non-cohesive materials will also make this difficult. We recommend that all reinforcement materials be chosen with specific correlation to expected local shear stresses, corrected for site geomorphology (e.g., radius of curvature) and other geotechnical factors. Given the physical scale of this project, we note a larger suite of treatment options can lower per-foot costs by using local or less expensive materials in passive low energy or depositional areas. An example is the extensive linear use of coir in the proposed design. While robust, coir logs and their installation are expensive, and long extents can propagate local failure. Where coir is used, attention should be given to RDG's points regarding anchoring, discontinuous installation, and cut-off sills.*

DEQ Response:

Streambank treatments are designed to meet the requirements of the ROD, the CD and the SMOA (especially the streambank guidelines) and to fit the channel shear stress and existing vegetation at the particular location. While the use of long extents of streambanks constructed from coir materials could fail, the long coir banks can also provide increased stability laterally in the event of a partial bank failure. As a result, this support is a one reason why coir bank construction is successful. To generate additional information about the use of coir materials in this design, DEQ directed the design team to complete the Streambank Treatability Study ("Streambank Pilot Project"). As a consequence another type of bank treatment will be used in the draft design for Reach A, Phase 1. This alternative bank treatment type will utilize existing vegetation and exclude the coir soil lift wrap. Other alternative bank treatment types will be considered and may be included in the draft construction bid package, if they fit the channel shear stress and existing vegetation of the streambank.

Page 3, ¶ 2 *The Reach 3 cutoff in Phase 2 has reduced the length of the Clark Fork River channel from approximately 1,253 feet through the meander to approximately 265 feet through the cutoff, reflecting a reduction in total channel length of approximately 988 feet. At an average reach slope of 0.001, this would cause a discontinuity of 0.98 feet. This suggests that the grade discontinuity generated by the cutoff has not substantially migrated upstream. Bank erosion and channel lengthening have absorbed some of the original steepened grade through the cutoff. If the continued lengthening of this cutoff channel is arrested by remedial action in Phase 2, it is important to consider the future of the grade discontinuity, in that profile data indicate that there is some potential for downcutting of up to a foot upstream of River Mile 2.6.*

DEQ Response:

The State is not sure that there is a grade discontinuity in Phase 2. The State has not seen the effects of the headcut that is the result of the cutoff in Phase 1 even though the cutoff occurred at least 50 years ago. This issue can be addressed when the State moves into the design for Phase 2. Nonetheless, the comment makes a very good point that a channel grade locally steepens when a cutoff of a meander bend occurs and, along with that, the channel length decreases. The State has designed a functioning floodplain that will allow the channel to gradually migrate over time and with the migration the grade will decrease, return to the original grade and maintain connection to the floodplain as natural functioning rivers do. In general, when meander cutoffs occur the channel, if not allowed to migrate, will deepen and become entrenched and the channel can lose floodplain connection over time. This comment highlights the need to have contamination removed from the floodplain and the reconstructed floodplain made of clean material for the river and riparian area to allow for channel migration in order to establish riparian vegetation and to have a properly functioning riparian river system.

Page 3, ¶ 3 *Excavating below the water table, as proposed in the draft PDP, in an alluvial aquifer presents a number of problems (for example, dewatering large volumes of water, discharge/treatment issues). Very limited groundwater data has been collected in Reach A and indicates that the groundwater underlying the Governor's Demonstration Project, located within Reach A, Phase 1, met ambient water quality standards in 2010 (Gordon, et al, 2010). However,*

the groundwater data collected in the Governor's Demonstration Project was only collected in the northern portion of Phase 1 and on the eastern side of the river. Groundwater downstream of Phase 1 at the Clark Fork Coalition Ranch had acute ambient water quality exceedances for cadmium, copper and zinc in 2010. This distinction is important because the southern portion of Phase 1 has high concentrations of zinc and copper at depth and this area was not treated as part of the Governor's Demonstration Project so the EPA assumes any groundwater that would be dewatered could potentially exceed ambient water quality ARAR standards and would need to be treated to meet these standards.

Page 3, ¶ 4 & Page 4 If point sources of water contamination from identifiable metals contamination are retained or created by remedial activity, applicable Clean Water Act standards would apply to those discharges. Limited groundwater has been collected in this area to demonstrate compliance with the applicable surface water quality standards. The draft PDP indicates that water from dewatering activities will be pumped into the Clark Fork River. A monitoring plan needs to be developed as part of PDP and final remedial design plans that contains provisions to monitor discharge to the river and to treat any groundwater that exceeds ambient water quality standards if DEQ determines that excavation at depth is still necessary.

DEQ Response:

The Clark Fork Remedy is effectively a "vegetation remedy," one that focuses primarily on treatment or removal of source material and stabilization of streambanks and the floodplain with healthy vegetation to prevent re-entrainment of waste. Water quality is expected to improve as the Remedy is implemented and sources of contamination are removed, treated and/or stabilized. The State is developing a Construction Quality Assurance Plan (CQAP) in conjunction with the Draft Construction Bid Package. Under the DEQ construction contract, quality control is performed by the construction contractor. Quality Assurance is the responsibility of the Owner (DEQ) and will be implemented by DEQ's Engineer as part of oversight. The CQAP will identify parameters to be monitored, monitoring locations and frequency. The plan is to perform in-stream monitoring upstream and downstream of the active work zone, similar to the monitoring conducted at SST and Milltown. Direct discharges to the river will not be monitored on the Clark Fork River (and were not monitored at SST or Milltown), unless DEQ decides it is necessary to monitor discharges, based upon an analysis of the data collected. If, based on monitoring results, water quality exceedances are detected, DEQ will evaluate the need to make changes to the dewatering plan. Changes in construction sequencing, operations, sediment basin holding times or other adjustments to the remedial construction contract will be made by Change Order, if warranted.

Page 4, ¶ 1 The PDP discusses a 6-inch over-excavation criteria. Without further information and justification, the EPA believes it is uncertain whether 6 inches of over excavation will remove all of the contaminated material. Post-remedial sampling of newly exposed material and determination of contaminant concentration prior to backfilling is not specified in this draft PDP and should be added. The EPA recommends post-removal confirmation sampling be discussed further in order to ensure that a sufficient depth of soils have been removed prior to starting backfill operations. At a minimum, visual examination for tailings material, as well as discrete soil sampling at predetermined locations and depth

intervals, are initially recommended. Further details can be discussed as remedial design proceeds but the issue is important and needs to be addressed and agreed to by the agencies.

DEQ Response:

The 6-inch over-excavation is fairly standard practice to ensure that intended level of removal is adequate. This practice is implemented because of the accuracy and limitations of sampling in a 125 foot grid pattern. A confirmation soil sampling plan will be included in the CQAP. Over-excavation can be adjusted if necessary based on sampling results during construction. These data will be evaluated post-construction to ensure that contamination removal is adequate [similar to SSTOU's plan]. The CQAP will be shared separately with EPA prior to implementation.

Page 4, ¶ 2 *While attention has been given to the various floodplain features to create heterogeneity, these features are largely unconnected to the active channel. This is a potential concern, particularly given the selection of the 2 year flow for channel design. While the stage difference between this flow and possible lower return interval flows may not be significant in terms of physical stability, it can significantly alter ecological processes and values. Furthermore, as RDG's review points out, lowered floodplain elevations often lead to more dependable passive and active revegetation, which is particularly relevant given this area's vulnerability to desiccation in winter, when irrigation is not possible. Lowered floodplain elevations lead to some risk of undesirable avulsions or other adjustments.*

DEQ Response:

Even though lowering the floodplain further might increase the connection of vegetation to the floodplain, it also increases the risk of avulsion unnecessarily, since the floodplain will have many wetland features and microtopography that will provide good safe sites for plant regeneration. In addition the Warm Springs groundwater on the west side of the project will inundate much of that area of the project. As a result, the State weighed the risks of lowering the floodplain elevation and elected to stay with the design for Phase 1.

Page 4, ¶ 3 *The final PDP should describe conceptual Operation and Maintenance (O&M) requirements so that the EPA understands DEQ's future role and plans upon completion of site remediation at Reach A Phase 1. A more formal O&M plan can be developed later according to the Clark Fork Site CD. Similarly, the Clark Fork Site CD and the ROD require the development of land owner best management practice plans. Conceptual ideas for these plans should also be discussed in the PDP, although specific plans are not required at this time and can be developed later.*

DEQ Response:

The State is developing a monitoring plan which focuses on Geomorphology and Vegetation (Note: Surface and groundwater monitoring are addressed under a separate plan, the "Interim Comprehensive Long-Term Monitoring Plan for the Clark Fork Site - 2012"). The objective of the "Clark Fork Site, Reach A, Phase 1, Geomorphology and Vegetation Monitoring Plan" is to

evaluate the response of geomorphology and vegetation variables to the remedy and restoration actions implemented. The purpose of this long-term monitoring plan is to:

- 1) Establish measurable goals, objectives and performance standards for vegetation and geomorphology that indicate success of remedy and restoration actions;
- 2) Document monitoring requirements for each performance standard over time;
- 3) Describe the sampling and analysis plan for collecting data to evaluate progress against these performance standards; and
- 4) Establish the adaptive management process for periodic review and revision of the monitoring plan, project goals and objectives, and actions implemented in future project phases based on the analysis of collected data.

Maintenance will be conducted on the site in a systematic way as the results of the construction are evaluated. Some maintenance may be undertaken when the remedial construction contract is still in effect. Other maintenance will have to follow under a separate contract. Any continued activities will be performed with landowner input and consent.

Page 4, ¶ 4 *The EPA recommends development of a Monitoring and Adaptive Management Plan as part of the PDP. Monitoring during construction, construction BMPs, and post-construction environmental monitoring will be required. Weed control for streambank stabilization and removal areas is also an important component of the ROD, and should be addressed.*

DEQ Response:

These questions are addressed in the plans described above: Construction Bid Package (including construction contract), submittals required by the construction bid package, CQAP, Interim Comprehensive Long-Term Monitoring Plan for the Clark Fork Site and Clark Fork Site, Reach A, Phase 1 Geomorphology and Vegetation Monitoring Plan. While under the Construction Bid Package the contractor will manage the spread of weeds and weed seeds during construction, weed control will be performed by DEQ contractors under separate contracts to perform weed spraying

Page 4, ¶ 5 *The EPA recommends development of a plan for minimizing negative effects on both recreational users and the surrounding community during construction and O&M phases as part of the design specifications. Discussion of this should be included in the PDP.*

DEQ Response:

Signs will be posted in the project area pre-, during and post-construction to notify potential users of property about activities that can and cannot be done. Press releases and newspaper advertisements will also update the public about construction activities.

Page 4, ¶ 6 *In response to a 1989 fish kill, clean fill was brought in to construct earthen berms to reduce the amount of runoff from exposed tailings. The PDP should consider and*

discuss to the possibility of salvaging clean berm material for use as backfill rather than disposing of it offsite?

DEQ Response:

DEQ considered the salvaging of the berm material, but determined that the cost and time necessary to evaluate and implement the needed quality control associated with separating this berm material from the waste is not cost-effective. Further, there is insufficient material in the berms to satisfy construction needs. The berms also have large amounts of weeds and weed seed associated with them.

Page 4, ¶ 7 Review of sheets C2 and C3, Existing Conditions, indicates that over 10% of the test pits could not safely or practically be opened and sampled and the depth of contamination was given a greater than sign. The PDP should describe how the final excavation depth was determined for these areas?

DEQ Response:

The State for the most part used that last contaminated sample as the base of the removal. The 6-inch over-excavation and confirmation sampling will ensure that adequate removal has been done.

Page 4, ¶ 8 The EPA believes it is important for DEQ to fully explore and document the ramifications of its design to lower the floodplain. Issues that should be examined in more detail in the PDP include bank stability, movement of sediments, and deposition during periodic flooding, land use, and future land management, among others. These issues present some site risks, especially during the initial growing period of the stabilizing vegetation. For example, if sediment loads to the reach increase due to the progressive delivery of bedload through the Mill/Willow bypass, sediment storage may ensue, and erosion locations and severities may change. Similarly, if a large flood event were to occur in the reach, banks that currently show no evidence of retreat may destabilize.

DEQ Response:

Currently, the Phase 1 area has much less sediment transport than a natural system would due to the sediment that is captured by Warm Springs Ponds. In addition, the ponds have also suppressed peak flows, which reduces the high flow peak shear-stresses on the streambanks. EPA is correct that a large flow could increase the bedload from the tributaries, but the shear stress of the entrenched channel and floodplain would also significantly increase. The Phase 1 design will lower the floodplain, which will reduce the shear stress on the banks when the flow exceeds that two-year flow. The banks are designed to a 10-year event. With or without large-scale waste removal, a large flow event, e.g. a 100-year event, is likely to cause significant channel changes and erosion. But, if we don't remove the waste, a large flood event would likely cause a substantial re-entrainment of contaminated waste into the river. There are always risks in working on land contaminated by mining wastes in a river and riparian setting. Many of these risks can be addressed through post-construction monitoring and maintenance. With a

large flow event, the risk of large scale re-entrainment of waste into the Clark Fork River cannot be so easily mitigated

Page 4, ¶ 9 & Page 5 ¶ 1 *There are sections of the draft PDP that need further clarification and amplification. The PDP states that the system is erosive because of contaminants, but also documenting low width/depth ratios and little plan form change — these conditions and theories need to be explained in a more consistent manner. Other issues such as questionable use of plan form/avulsion risk metrics from a sandbed reference system (and as a result the berming shown in Figure 3.1 and described in Section 3.2.2.3 may not be necessary or appropriately designed), more detailed planning for vernal features, discussion of clear utilization of LIDAR data up to its potential, and more information concerning ingress/egress and haul path design to minimize compaction or avulsion risk should be addressed in the final PDP.*

DEQ Response:

The design team fully evaluated the risks of not increasing the outer banks and determined that it is an acceptable way of reducing the risk. Remediating the area through the removal of waste and lowering the floodplain is by far a better way to achieve appropriate vegetation in the floodplain, the requirements of the ROD, performance standards and ARARs. The cost for maintenance will be much less since the vegetation emphasizes a self-sustaining mosaic of riparian and wetland communities. Also, the design does not rely on vegetation to hold a substantial amount of contamination in place within the meander width of the river. Even in well-vegetated and non-contaminated river systems large floods often remove healthy vegetation from within the meander belt. If a large flood event were to occur in the remediated areas, where waste is left in place, then waste would be re-entrained back into the river.

Page 5, ¶ 2 *In general terms and with the points above and below noted, this plan manifests strengths in describing goals and standards, hydrologic and geomorphic contexts, and both active and passive revegetation. EPA suggests further detail should be included regarding ecological metrics and goals, clear logic paths, and site specificity in selection and application of restoration techniques, as well as articulation of a strong monitoring and adaptive management plan. This document may not have been meant to address biotic response issues, but since it addresses an integrated program at least some reference to these issues in early planning is desirable. Since this is an interagency effort, more specific hypotheses, integration pathways, and expected response metrics would aid coordination, implementation, and communication between agencies and between agencies and the public. In addition, these refinements, as well as acknowledgment of various risk factors and sources of uncertainty, would help in project implementation, adaptive management, and public expectations and perceptions.*

DEQ Response:

The short and long-term monitoring described in the plans above (Interim Comprehensive Long-Term Monitoring Plan for the Clark Fork Site – 2012 and Clark Fork Site, Reach A, Phase 1, Geomorphology and Vegetation Monitoring Plan) will provide information on which we can learn from earlier phases of the CFR cleanup.

Page 5, ¶ 3 *While the combination of high metals and high sulfate concentrations suggests that many of Contaminants of Concern (CoCs) are present in the shallow soil as water-soluble sulfate salts, there is no data presented in previous investigations to support the statement that heavy metals are leaching into groundwater and ultimately into the surface water in this phase of the project. As noted the limited groundwater data available indicates that the existing groundwater may meet groundwater standards currently. Please explain or modify this statement.*

DEQ Response:

The connection between groundwater and surface water is observed in the Record of Decision. Three examples are offered. The model of the pathways in the ROD, page 2-13 states: "The primary pathways by which contaminants move within and between media include tailings and soils, groundwater, surface water and airborne transmissions." And on page 2-33, Fate and Transport, Exhibit 2-10, indicates that groundwater inflow contributes contamination to the mass balance of the copper load of the surface water of the river. Finally: "[S]uccessful reclamation of land contaminated by mining activities within the Clark Fork River OU is defined as establishing plant communities capable of stabilizing soils against wind and water erosion, reducing transport of COCs to groundwater and surface water, and compliance with ARARs or replacement standards in perpetuity." ROD, pages 2-126 and 2-127.

Page 5, ¶ 4 *Multiple contaminant transport pathways are described, but no linkages are made between selected cleanup techniques and pathways. Additional explanation should be added.*

DEQ Response:

Source removal is the most cost-effective contaminant control remedy for the waste of the Clark Fork River. It removes the large majority of the waste, which in turn greatly reduces the supply of metals to the surface water, groundwater, airborne and direct contact to all the COCs.

Page 5, ¶ 5 *No supporting information is provided for the statement in the PDP that "tailings depths on the specific property may be greater than those at downstream reaches where investigations are currently being undertaken."*

DEQ Response:

The data supporting this statement was provided to EPA in the Phase 1 Data Summary Report (DSR), Phase 2 DSR, Phase 7 DSR and the Phase 15 & 16 DSRs which have already been shared with EPA. (Note: DEQ is still compiling the DSRs for Phases 5 and 6. They will be shared with EPA when they are completed and have been reviewed by DEQ).

Page 6, ¶ 1 *DEQ should provide its basis for how contamination in Reach A is "exacerbated by depth of tailings," given the next statement that "these sources directly impact plant and animal life through uptake and ingestion, and also impact humans who come in contact with the soils." Depth of tailings would tend to mitigate uptake, ingestion, and direct contact. As*

indicated above, DEQ has provided no basis to support the statement that "metals are leached directly from the tailings into groundwater and surface water."

DEQ Response: See response for Page 5, ¶ 3.

Page 6, ¶ 2 *DEQ provided no information on its classification system performed by Geum, its contractor, in 2010. DEQ should provide detailed data on the studies performed by Geum on its behalf.*

DEQ Response:

See Phase 1, PDP, Table 2-2, Column 2, which provides the classification criteria. More broadly, the existing vegetation communities are named according to the tallest layer, and they are distinguished as wet or dry based on whether they have hydrophytic vegetation and/or hydrology indicators per the Army Corps of Engineers routine wetland delineation method. To clarify, Geum did not conduct a formal wetland delineation. Instead, Geum applied some of the criteria used by that method as a way to capture presence or absence of functional wetland conditions. For the Phase 1 site, this vegetation mapping was used as one of several criteria to support the removal boundary location. Specifically, vegetation mapping confirmed that vegetation left in place outside the removal boundary to the west has wetland characteristics, and will therefore support floodplain functions similar to those we are designing for within the removal boundary. As the State continues to collect vegetation information in other phases, we will continue to evaluate the relationship between different vegetation communities and elevations relative to various river stages, contamination depths, mapped soils, and land use. Our objective is not to create a new classification system; rather, we are presenting our observations about where wetland hydrology is present using the simple naming scheme and criteria described here and in the document. As has been noted with other vegetation classification schemes, vegetation does not seem to be a strong predictor of tailings concentration or depth; however, as supported by existing methodologies such as routine wetland delineation, vegetation does reliably indicate hydrologic conditions. During our May 1st meeting we discussed how we could clarify our remedial approach under the ROD as we move forward with designs for subsequent phases of the work.

Page 6, ¶ 3 *Though DEQ's Bank Evaluation Hazard Index (BEHI) scores were high enough to raise concerns, the geomorphic investigation also documented low migration rates, high plan form stability, and low width/depth ratios. As this part of the draft PDP noted, poor vegetation cover rather than actual instability or morphologic form shifts seems to be the issue. In areas of low contamination and good vegetation cover, this characteristic should be noted and other means identified to reconnect floodplains and stimulate passive vegetation. In-channel constructed riffles are an example of this phenomenon.*

DEQ Response:

Although the Bank Erodibility Hazard Index is a useful method for evaluating the susceptibility of streambanks to erosion, and a generally poor model for predicting actual bank erosion or channel bend migration rates. The draft PDP adequately describes current and historical site

geomorphology within the context of the altered flow regime, historical land use practices, and effects of the bypass. Therefore, though BEHI is useful in some respects it is not the only factor to consider.

Page 6, ¶ 4 *The geomorphic study of the first 3.5 miles identified a gradient of 0.15 percent while the Governor's Demonstration Monitoring of the first 4.3 miles identified a gradient of 2.7%. Identification of local slope changes is an important factor in site treatment modality. It is assumed that additional transects were surveyed for the design allowing for greater accuracy but the final PDP should confirm that there is not a significant drop in elevation in Phase 3.*

DEQ Response:

DEQ confirmed with its design team that the average channel slope in the first 4.3 miles of the Clark Fork River is actually about 0.2%.

Page 6, ¶ 5 *Little discussion is in this section regarding the use of LIDAR data for anything other than topographic mapping. The PDP should indicate whether it will be used for physical monitoring and also if it shows the kind of dynamism and complex lateral and vertical flow paths that one would expect from the described historic conditions of significant beaver populations. The PDP should also describe whether there any evident remnant features that may have induced disproportionate tailings deposition or that could inform assessment of interflow pathways.*

DEQ Response:

The LIDAR data is valuable and will likely be used in future monitoring efforts that remain to be determined.

Page 6, ¶ 6 *The EPA questions the statements in the draft PDP that 95% of the total area of tailings is saturated or potentially saturated during high water periods. In about 40% of the test pits that were completed at a distance greater than 125 feet from the river, no groundwater was encountered and the majority of the test pits where groundwater was encountered were located on the west side where the ground is saturated year round. A review of the test pit logs that were dry indicate that the soils were fairly dry for the first 24 inches which does not correlate to being saturated during high water periods. In addition, the Sampling and Analysis Plan for this area did not have a Standard Operating Procedure developed for determining moisture at depth.*

Page 6, ¶ 7 *The only groundwater collected in Phase 1 was collected in close proximity to the river channel and was only collected in one location at the northern boundary of Phase 1 on the east side of the river (Gordon et al 2010). Therefore, the groundwater data collected in support of this PDP is not a true representation of groundwater conditions in the Phase 1 remedial study area and may not be applicable to the whole study area.*

Page 7, ¶ 1 *In short, better and more supported documentation and description of the saturated or potentially saturated area for Phase 1 should be provided.*

DEQ Response:

The pit water data that was collected has limitations and a more in depth groundwater hydrologic study over a longer period of time would have given us more data. Nonetheless, the State's interpretation of this data did not exceed these limitations as was demonstrated by the June 2011, flow through Phase 1 which completely inundated the area designed for removal in the PDP. The pit data also shows that even in low flows a portion of the base of tailings are in the groundwater. The Gordon study was not intended as an in depth study. This data and shallow data of these pits together were used to estimate groundwater condition in the project area. The fast rate in which pits filled as well the Gordon suggests that the river level and the groundwater are integrally connected. Installation of piezometers would improve the estimates of the water levels within each specific reach especially over time. Nonetheless, Phase 1 seems to have a significant amount of tailings below low groundwater level and nearly all of the tailings are greater than 2 feet deep. Since the ROD states that either one of these parameters would trigger removal it is not necessary to fully define the amount of groundwater inundation. See ROD pages 95-97 which indicates that exposed tailings or slickens areas and contaminated soils beneath these areas within the entire floodplain will be removed. Areas of impacted soils and vegetation are to be treated in-situ unless tailings and impacted soils in a given area extend more than 2 feet below ground surface (too deep) or are too wet for implementation of in-situ treatment. The ROD says these contaminated materials that are either too deep or too wet should be removed.

Page 7, ¶ 2 *Lime is only slightly soluble in water. Therefore, the addition of lime to acidic soils/mine waste can be effective even with some water influence on the soils/waste. If lime is amended into surficial soil/mine waste above the water table, there should be no significant dissolution of the lime due to rising water table. There was an opportunity to collect data in support of the statements concerning treated area in the draft PDP and to properly evaluate the results of Governor's Demonstration Project because lime was amended to the soil as part of the Governor's Demonstration Project 20 years ago. However, most of the samples taken in the lime amended areas were screened using XRF for metals, and were not submitted to a laboratory for this type of analysis. Therefore, the statement that the lime will not remain in place under saturated conditions needs specific site data to support it, or the statement should be deleted. Lime is only slightly soluble in water, so the basis for excavating contamination that is saturated for only a portion of the year as necessary in lieu of the in-situ treatment remedial action described in the ROD may not reflect what has actually occurred.*

DEQ Response:

The State agrees to remove the statement about lime, as suggested by EPA.

Page 7, ¶3 *Since the ROD had multiple human health standards for arsenic, please specify which arsenic standard is being used and why this standard supports the anticipated future land use for Phase 1.*

DEQ Response:

The applicable cleanup level for Phase 1 is the recreational standard for arsenic, which is 1,600 ppm.

Page 7, ¶ 4 *DEQ has developed a proposed removal criteria of 800 mg/kg, where removal is indicated by site conditions, for the sum of the concentrations of copper, zinc, lead, cadmium & arsenic. This value came from a technical memorandum developed by the EPA's contractor CH2MHiI in 2008 that was intended to provide guidance on the removal of soils greater than 2 feet in thickness in areas identified by the Riparian Evaluation System (RiPES) as exposed tailings (slickens) or impacted soils (CH2MHiI, 2008). The memorandum also provides guidance to address associated questions relative to the determination of the limit or depth of contamination in areas that were scored as slickens or impacted. It was never intended to be used as a Basis for Action or action level for broad based removals. The EPA considers the use of the 800 mg/kg for broad-based removal actions, such as is proposed in the draft PDP, to be relevant to restoration (return of conditions to baseline, pre-contamination), but not as a remedial action cleanup level.*

DEQ Response:

The State and EPA have agreed the Reach A, Phase 1 project will proceed to construction this fall, despite our disagreement over the intent, purpose or relevance for which the 800 ppm combined COCs was offered or used by the State. As discussed during the May 1st meeting, the State will offer an alternative to the 800 ppm combined COCs in the future.

Page 7, ¶ 5 *The technical memorandum at issue also recommended that, in addition to the concentrations of the contaminants of concern, a pH value below 6.5 was also an important factor in Determining areas to excavate (CH2MHiI, 2008). DEQ only looked at the sum total of the CoCs and did not consider pH values in determining removal areas in the draft PDP. A review of all samples sent to the lab for analysis indicates that about 15% of the samples analyzed for pH had values below 6.5.*

DEQ Response:

See Response page 7, ¶ 4.

Page 8, ¶ 1 *The need for the raised area described here is questionable given the system's attenuated peak flow regime. The design is based on studies by Slingernun and Smith, and those authors derived their rule of thumb on sand-bed streams, which may not be wholly relevant for the upper Clark Fork. Please reconsider this aspect of the design. If it is judged to be necessary, it should be inset from current bank lines. Lowering the inner meander elevations may be only temporarily effective as the project moves downstream and the system's sediment supply renews itself.*

DEQ Response:

Elevating the outer banks 6 inches is a good technique to reduce short-term avulsion risk and development of meander cutoffs. The adaptive management and future designs may reconsider this grading feature depending upon the success of Phase 1.

Page 8, ¶ 2 *Should vernal pools be included for amphibian recruitment?*

DEQ Response:

Depending upon the local hydrology, some of the floodplain swale features may function like vernal pools also known as seasonal ponds.

Page 8, ¶ 3 *The PDP states that "removal has been selected as the appropriate remedy for Phase 1." The remedy for the Clark Fork River Operable Unit was selected in the Record of Decision.*

DEQ Response:

The ROD on page 2-86 states: "Areas of impacted soils and vegetation that have tailings and impacted soils extending deeper than 2 feet will be removed...". The statement in the PDP matches what is to be implemented with what is required in this ROD.

Page 8, ¶ 4 *Please provide the rationale for assuming a 6-inch over-excavation depth. As noted, DEQ will need to include the development of plans for confirmation sampling at the base of excavations, including the frequency representative area(s) from which samples will be collected, and whether DEQ will use composite samples or single point samples to confirm the limits of its excavation.*

DEQ Response:

See discussion of CQAP above.

Page 8, ¶ 5 *Please note that "the cutoff between contaminated and clean material" was not recommended by the EPA "for removal of tailings deeper than 2-feet deep."*

DEQ Response:

So noted.

Page 8, ¶ 6 *As noted above, the EPA questions the need to excavate below the groundwater level. If this aspect of the design is included, the design criteria, another step needs to be included that discusses sampling of the groundwater prior to discharge to ensure it is in compliance with ambient water quality standards and a contingency plan developed for treating this water prior to discharge if there is an exceedance.*

DEQ Response:

A monitoring process will be in place. See Response page 3, ¶ 3.

Page 8, ¶ 7 *Dewatering needs to address in detail design and site reclamation to minimize avulsion risk, techniques to dewater in climatic or flow anomalies, and cut-off standards.*

DEQ Response:

See above.

Page 8, ¶ 8 *Some language regarding ingress-egress design, equipment specs, and post-project road removal to minimize compaction, removal costs, and potential for avulsion is needed.*

DEQ Response:

Much of this information will be in the Draft Bid Package BMPs. The impacts of an avulsion during construction are being minimized by restricting the contractor's extent of area that is excavated without backfilling and restricting bank treatments to only limited times of the year when flow is low.

Page 9, ¶ 1 *Rather than refer the reader to prior unapproved documents pertaining to Construction Best Management Practices, include these as an appendix to the PDP.*

DEQ Response:

BMPs will be discussed in the Draft Bid Package and in submittals from the construction contractor to DEQ (e.g., Erosion Control Plan, Transportation Plan) for approval under the construction contract.

Page 9, ¶ 2 *Contamination at depth also exists between stations 97+00 and 104+00. Some discussion needs to be included on how water will be managed in this area.*

DEQ Response:

As discussed during our May 1, 2012 meeting, all water that is a result of dewatering during construction will be handled the same.

Page 9, ¶ 3 *Both reviews raise excellent points and are well executed. DEQ is commended for obtaining these reviews. The points raised about incipient motion calculation techniques and toe material sizing are central issues for consideration and should be addressed carefully by DEQ. The remediation plan strikes an admirable balance between short-term stability and long-term deformability, but a small, specified safety factor and guidelines for scour depth and flanking protection are desirable to maximize implementation efficiency and to minimize the*

potential for equipment operator judgment errors. Similarly, guidelines and standards for lenses of clay and sand encountered during implementation are needed.

DEQ Response:

The State appreciates the positive comments and also thinks the peer review was valuable. Though they brought up some good points to consider, for the most part they agreed with the State's design. Furthermore, careful and complete oversight of operator judgment should reduce potential errors that could occur. Also, the design will require the use of GPS installed equipment so the operator grading errors can be minimized.

Page 9, ¶ 4 *As noted above, the EPA is committed to working with DEQ to address these issues in a timely and cooperative manner such that the production of a final PDP can proceed quickly. The EPA recognizes the environmental benefits of the proposed project and looks forward to working cooperatively with DEQ to implement a successful project.*

DEQ Response:

Thank you.

The State hopes to build upon the conversations during the May 1, 2012 meeting, as we move forward together in this process. As we have done in the past, I will continue to share information with EPA as it is developed. If you have any questions, please call me (841-5043 or 461-3070). Tom Mostad can answer questions about restoration (444-0227). Brad can also answer questions about the process and the construction bid package. Feel free to call him too (841-5023 or 438-7856).

Sincerely,



Brian Bartkowiak
Upper Clark Fork River Project Manager

c: Julie DalSoglio, Director Montana Office EPA
Joe Vranka, EPA
Henry Elsen, EPA
Jim Martin, Regional Administrator, EPA Region 8
Howard Cantor, Deputy Regional Administrator, EPA Region 8

Richard Oppen, Director, DEQ
Sandi Olsen, DEQ
Larry Scusa, DEQ
Brad Smith, DEQ

Tom Mostad, NRDP
Rob Collins, NRDP
Mary Capdeville, NRDP